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ABSTRACT

Recently, methodologists interested in examining problems associated with measuring change have suggested that developmental researchers should focus upon assessing change at both intra-individual and inter-individual levels. This study used an application of individual growth curve analysis to the problem of maternal postpartum depression. Traditional research on predictors of postpartum maternal mood has focused on predicting depression at a single point in time postpartum. The purpose of this study was to predict longitudinal change in depression scores taken at 3.5 months and 8.5 months postpartum. Subjects (N=138) were participating in a large study of pregnancy and the transition to parenthood. Individual growth curve analysis revealed that initial depression and emotional lability observed at 3.5 months pregnancy significantly accounted for variance in the slope of depression scores over these four times. Initial depression was found to be negatively associated with postpartum depression; emotional lability was found to be positively associated with postpartum depression. The superiority of this growth curve analysis lies in its ability to predict change in maternal mood over several time points during pregnancy and parenthood, whereas previous methods have focused on predicting a single depression score at some point postpartum. This method allows for a more detailed analysis of individual differences in patterns of development. (Author/ABL)

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Predicting Change in Postpartum Depression: An Individual Growth Curve Approach

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ABSTRACT

Traditional research on predictors of postpartum maternal mood have focused upon predicting depression at a single point in time postpartum. The purpose of this study was to predict longitudinal change in depression scores taken at 3.5 months and 8.5 months pregnancy and 3.5 months and 8.5 months postpartum. Individual growth curve analysis revealed that initial depression and emotional lability observed at 3.5 months pregnancy significantly accounted for variance in the slope of depression scores over these four times (adjusted R^2 =.28). Initial depression was found to be negatively associated with postpartum depression; emotional lability was found to be positively associated with postpartum depression.

Predicting Change in Postpartum Depression: An Individual Growth Curve Approach

Recently, methodologists interested in examining problems associated with measuring change (Bryk & Raudenbush, 1987; Burchinal & Applebaum, 1991; Rogosa, 1988; Rogosa, Brandt, & Zimowski, 1982; Willett, 1988; Willett, 1989) have suggested that developmental researchers should focus upon assessing change at both intra-individual and inter-individual levels. In other words, developmental research would be better served by investigations of factors that account for differences in developmental changes across individuals. However, with few exceptions (Aldwin, Spiro, Levenson, & Bossé, 1989), empirical applications of this theoretical approach have yet to appear in the literature of developmental psychology.

The present study represents an application of individual growth curve analysis to the problem of maternal postpartum depression. It is well established that the majority of women do not experience depression during pregnancy or subsequent to the birth of an infant; a smaller group are depressed both pre- and postpartum. A still smaller group of new mothers, not depressed during pregnancy, will experience a depressive episode within the first several postpartum months. Further, differences among these groups are not well understood.

Typical methodologies employed in studies of postpartum depression include the comparison of depression at two points using difference scores (Atkinson & Rickel, 1984; O'Hara, Neuaber, & Zekoski, 1984) or the comparison of individual bivariate correlations over time (Belsky, Spanier, & Rovine, 1983; Fleming, Ruble, Flett, &

Van Wagner, 1990). Both approaches very likely inhibit rather than facilitate understanding of changes in maternal depression through the course of pregnancy and postpartum by using a single measure as a criterion and attempting to predict it.

The alternative methodology presented here places an emphasis on change over time rather than at a final point or a series of two-wave comparisons. This methodology—individual growth curve analysis—is geared toward predicting who will change rather than simply who will be depressed at some later time.

Method

Subjects were 138 female who were participating in a large study of pregnancy and the transition to parenthood. Each participant completed a series of questionnaires at two points prenatally (3.5 and 8.5 months of pregnancy) and two points after the birth of her child (3.5 and 8.5 months postpartum), yielding a four-wave longitudinal design.

At each assessment point, subjects completed the Beck Depression Inventory (BDI) (Beck, Ward, Mendelson, Mock, & Erbaugh, 1961) and the State-Trait Anxiety Inventory (STAI) (Spielberger, Gorsuch, Lushene, Vagg, & Jacobs, 1983). At 3.5 months pregnancy subjects also completed Levenson's Multidimensional Locus of Control Scale (Levenson, 1981), the Dyadic Adjustment Scale (Spanier, 1976), a scale measuring attitude toward and planning of the current pregnancy (Steffensmeier, 1982), and a social support measure (Cutrona, 1984). Individuals' standard devia-tion of their state-trait anxiety scores at each of the four times were computed as a measure

of emotional lability. Using prenatal and post-partum BDI scores subjects were classified into depress-ion groups. As expected, seventy-six of the women (55%) were neither depressed prenatally or postpartum. Five women were chronically depressed (4%), thirty eight were postpartum depressed (28%), and nineteen were depressed prenatally, but not depressed postpartum (14%).

Results

Prior to preforming growth curve analyses, all variables were examined for violations of relevant multivariate assumptions. None was found. Following a procedure presented by Willett (1988), an individual growth curve analysis (GCA) was performed in two steps. Step One involved fitting an ordinary least square (OLS) regression model for each subject regressing depression scores on four time points. This procedure produced linear slope estimates (THETA) for each subject. As a measure of the fit of a linear model to this four-wave data, on average each slope accounted for 30% of the variance in depression scores over time. The linear slope estimates were used as measures of individual change over time, with positive slopes indicating increases in depression. Step Two involved assessing whether any systematic individual change existed across individuals by regressing several predictors obtained in pregnancy—BDI score, state and trait anxiety scores, locus of control scores, and emotional lability—on the slope estimates.

Table 1 presents the results of these OLS multiple regression analysis. The best-fitting model accounted for 29% of the variance in observed change in maternal depression. The significant predictors

in this model were maternal depression (MBDI1) and emotional lability (TRVAR), both observed early at 3.5 months pregnancy. Using a technique described by Jaccard, Turrisi, and Wan (1990), no interaction effect for the two predictors was found for this model.

Figure 1 presents a scatterplot of THETA by MBDI1, revealing higher depression scores in early pregnancy lead to a decrease in the amount of linear change in later depression scores. Figure 2 presents a scatterplot of THETA by TRVAR, showing that increases in lability predicted greater linear change in depression scores over time. Points on these scatter-plots are labeled by depression group.

Discussion

This study found that differences in women's changing levels of depression from 3.5 months pregnancy to 8.5 months postpartum were associated with both their initial depression and with the variability of their state-related anxiety during pregnancy and the transition to parenthood.

The superiority of this growth curve analysis lies in its ability to predict change in maternal mood over several time points during prenancy and parenthood, whereas previous methods have focused on predicting a single depression score some point postpartum. Not only does this methodology provide a logical way of investigating model of psychological change (Rogosa, 1988; Willett, 1989), but it allows for a more detailed analysis of individual differences in patterns of development.

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Table 1. Results of OLS multiple regression analysis predicting change in depression scores (THETA) using depression score (MBDI1) and emotional lability measure (TRVAR) obtained at 3.5 months pregnancy (n=138).

Model Summary:

	df	SS	MS	*F*	*p*	R^2
Model	2	106.22	53.11	27.78	.0001	.29
Error	135	258.14	1.91			
Total	137	364.37				

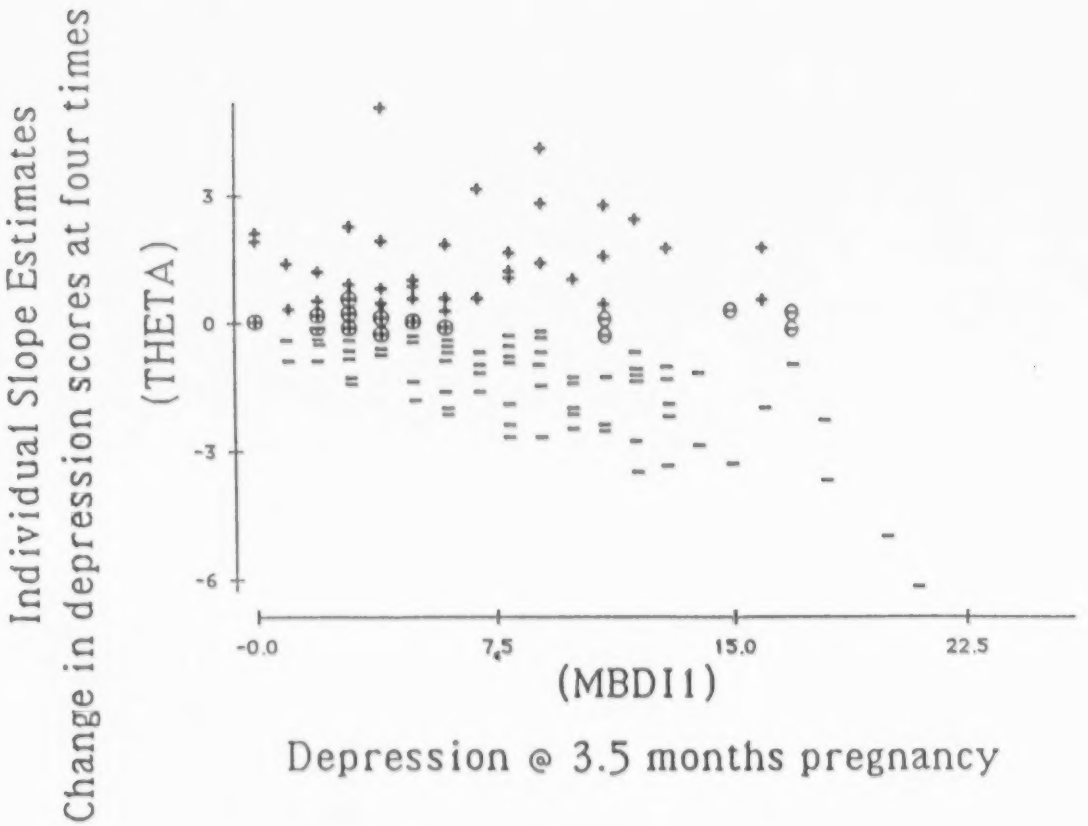
Parameter Estimates:

	df	Parameter Estimate	Standard Error	*t*	*p*
Intercept [α]	1	0.056	.254	0.22	.8259
TRVAR [β_1]	1	0.188	.042	4.43	.0001
MBDI1 [β_2]	1	-0.176	.025	-7.07	.0001

Linear Model Equation: $Y = \alpha + \beta_1 (X_1) + \beta_2 (X_2) + e$

THETA = .056 + .188(TRVAR) + -.176(MBDI1) + e

Figure 1. Scatterplot of change in maternal depression (THETA) as a function of maternal depression observed at 3.5 months pregnancy(MBDI1), $r_{(138)} = -.43$.



Legend

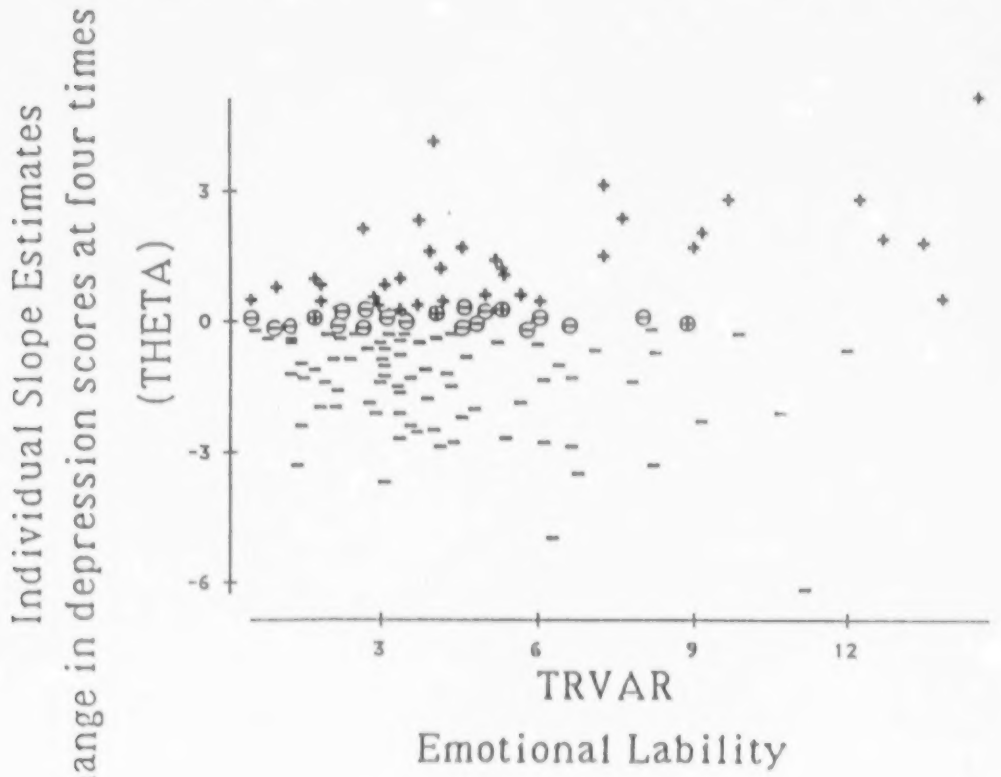
+ = Postpartum Depressed Group (n=38)

⊕ = Prenatal & Postpartum Depressed Group (n=5)

⊖ = Postpartum Nondepressed Group (n=19)

– =Prenatal & Postpartum Nondepressed Group (n=76)

Figure 2. Scatterplot of change in maternal depression (THETA) as a function of emotional lability observed at two points pregnancy and two points postpartum (TRVAR), $r^{2}_{(138)} = .172$.



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